

Mechanical Summary**MECH-SUM**

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised December 2010

Project Info	Project Address	Date
		For Building Dept. Use
	Applicant Name:	
	Applicant Address:	
	Applicant Phone:	

Project Description Briefly describe mechanical system type and features.	
<input type="checkbox"/> Includes Plans	Include documentation requiring compliance with commissioning requirements, Section 1416.

Compliance Option	<input type="radio"/> Simple System <input type="radio"/> Complex System <input type="radio"/> Systems Analysis (See Decision Flowchart (over) for qualifications. Use separate MECH-SUM for simple & complex
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Equipment Schedules	The following information is required to be incorporated with the mechanical equipment schedules on the plans. For projects without plans, fill in the required information below.
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Cooling Equipment Schedule									
Equip. ID	Equip Type	Brand Name ¹	Model No. ¹	Capacity ² Btu/h	OSA CFM or Econo?	SEER or EER	IPLV ³	Econmizer Option or Exception ⁶	Heat Recovery Y/N

Heating Equipment Schedule									
Equip. ID	Equip Type	Brand Name ¹	Model No. ¹	Capacity ² Btu/h	OSA cfm or Econo?	Input Btuh	Output Btuh	Efficiency ⁴	Heat Recovery Y/N

Fan Equipment Schedule								
Equip. ID	Equip Type	Brand Name ¹	Model No. ¹	CFM	SP ¹	HP/BHP	Flow Control ⁵	Location of Service

¹If available. ² As tested according to Table 14-1A through 14-1G. ³ If required. ⁴ COP, HSPF, Combustion Efficiency, or AFUE, as applicable.⁵ Flow control types: variable air volume(VAV), constant volume (CV), or variable speed (VS). ⁶ Exception number from Section 1433.

Mechanical Summary (back)

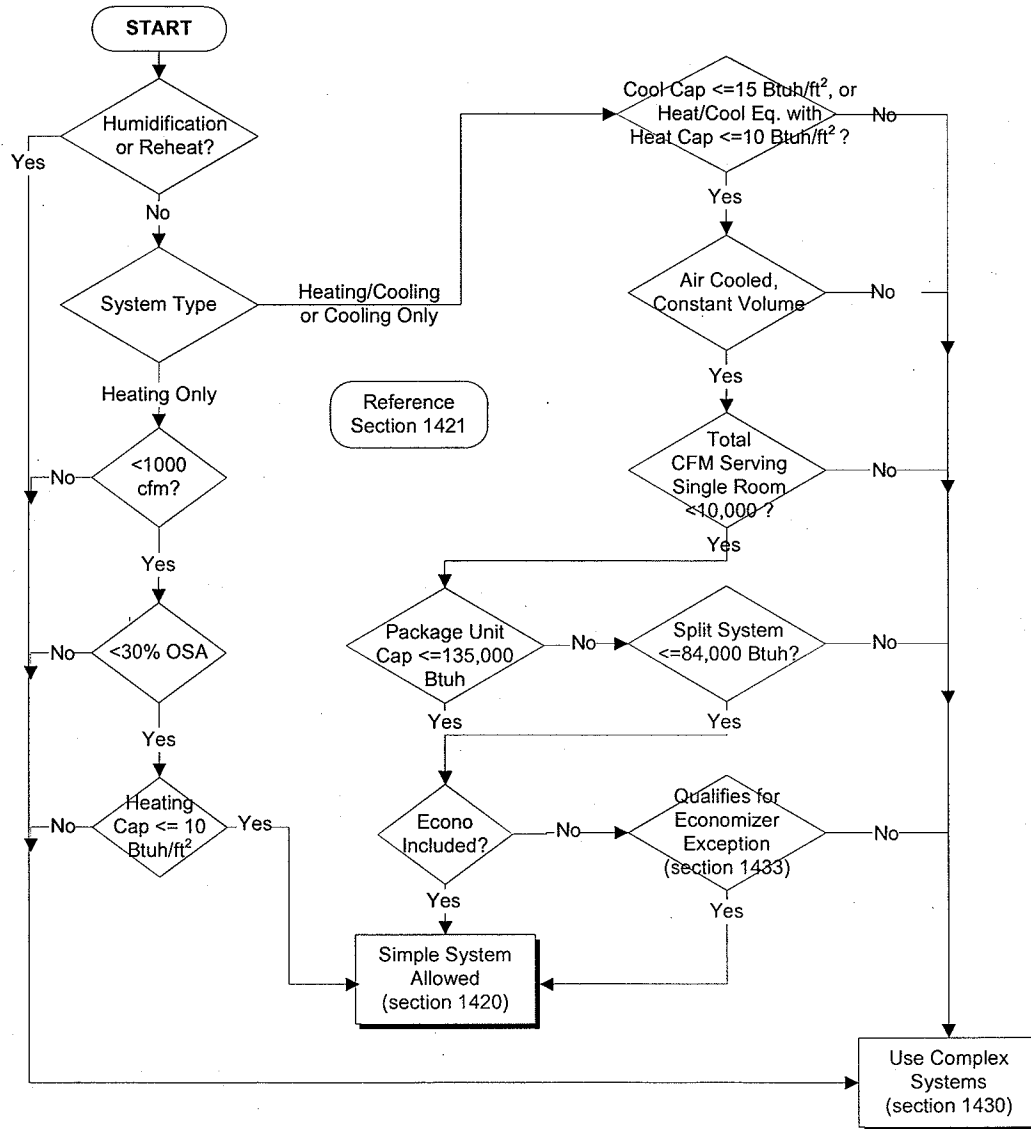
MECH-SUM

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System Description See Section 1421 for full description of Simple System qualifications.	All Systems: <input type="checkbox"/> No humidification? <input type="checkbox"/> No Reheat?	
	If Heating/Cooling or Cooling Only: <input type="checkbox"/> Constant vol? <input type="checkbox"/> Split system? <input type="checkbox"/> <=84,000 Btuh? <input type="checkbox"/> Economizer	
	<input type="checkbox"/> Air cooled? <input type="checkbox"/> Packaged sys? <input type="checkbox"/> <=135,000 Btuh? <input type="checkbox"/> Cooling Cap <=15 Btuh/ft ² ? <input type="checkbox"/> Heating Cap. > 0 & <=10 Btuh/ft ² ?	
If Heating Only: <input type="checkbox"/> <1000 cfm? <input type="checkbox"/> <30% outside air? <input type="checkbox"/> Heating Cap. <=10 Btuh/ft ² ?		

Decision Flowchart	Use this flowchart to determine if project qualifies for Simple System Option. If not, either the Complex System or Systems Analysis Options must be used.
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Complex Systems

Refer to MECH-COMP Mechanical Complex Systems for assistance in determining which Complex Systems requirements are applicable to this project.

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¹If available. ² As tested according to Table 14-1A through 14-1G. ³ If required. ⁴ COP, HSPF, Combustion Efficiency, or AFUE, as applicable.
⁵ Flow control types: variable air volume(VAV), constant volume (CV), or variable speed (VS). ⁶ Exception number from Section 1433.

Mechanical Summary (back)**MECH-SUM**

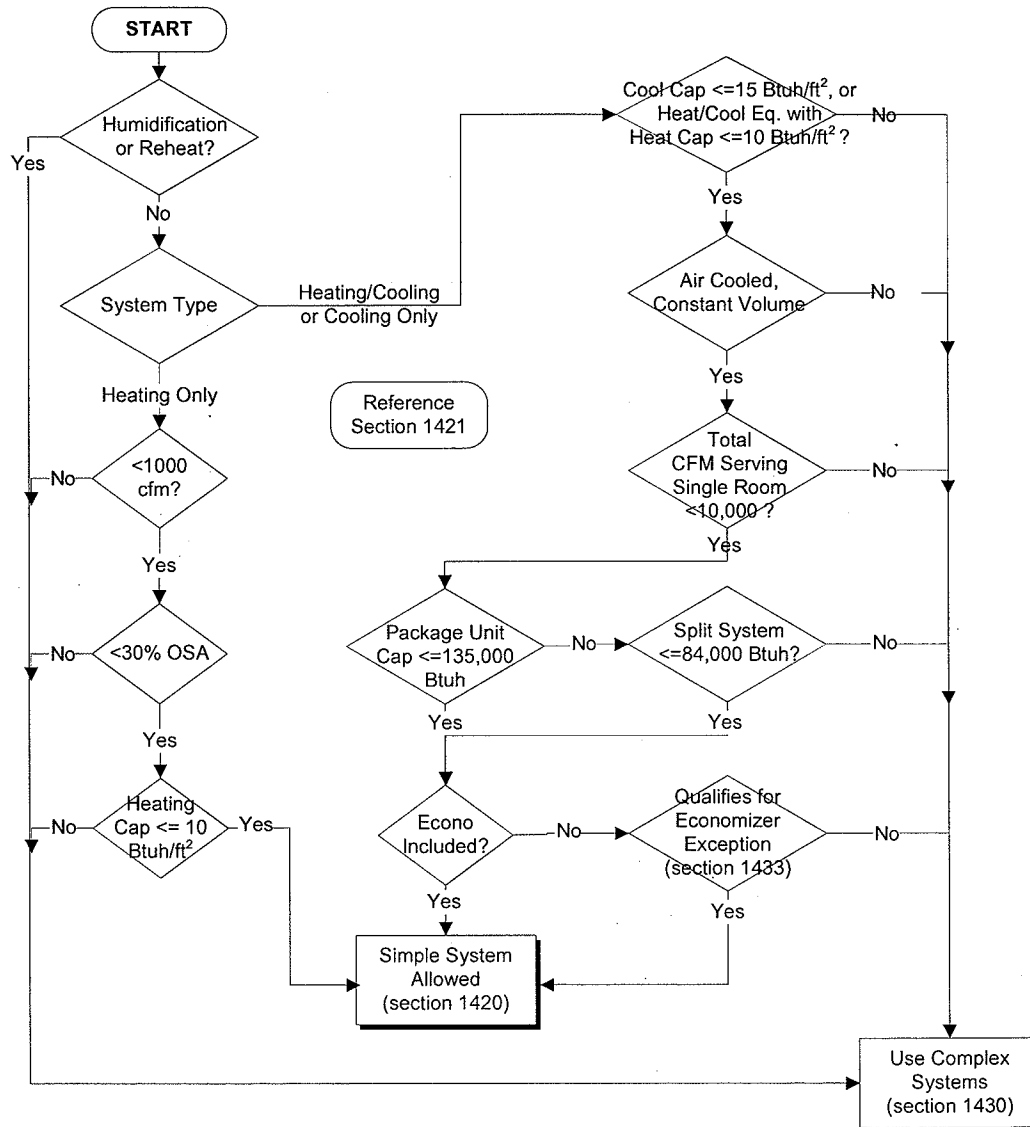
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Decision Flowchart

Use this flowchart to determine if project qualifies for Simple System Option. If not, either the Complex System or Systems Analysis Options must be used.

**Complex Systems**

Refer to MECH-COMP Mechanical Complex Systems for assistance in determining which Complex Systems requirements are applicable to this project.

Mechanical - Complex Systems Checklist**MECH-COMP**

2009 Washington State Energy Code Compliance Forms for Nonresidential and Multifamily Residential

Revised December 2010

Project Address

Date

For Building Department Use

The following additional information is necessary to check a mechanical permit application for a complex mechanical system for compliance with the mechanical requirements in the Washington State Nonresidential Energy Code. Use the checklist as a reference for notes added to the mechanical drawings (see the MECH-CHK checklist for additional requirements). This information must be on the plans since this is the official record of the permit. Having this information in separate specifications alone is NOT an acceptable alternative.

Applicability

Code

Component

Information Required

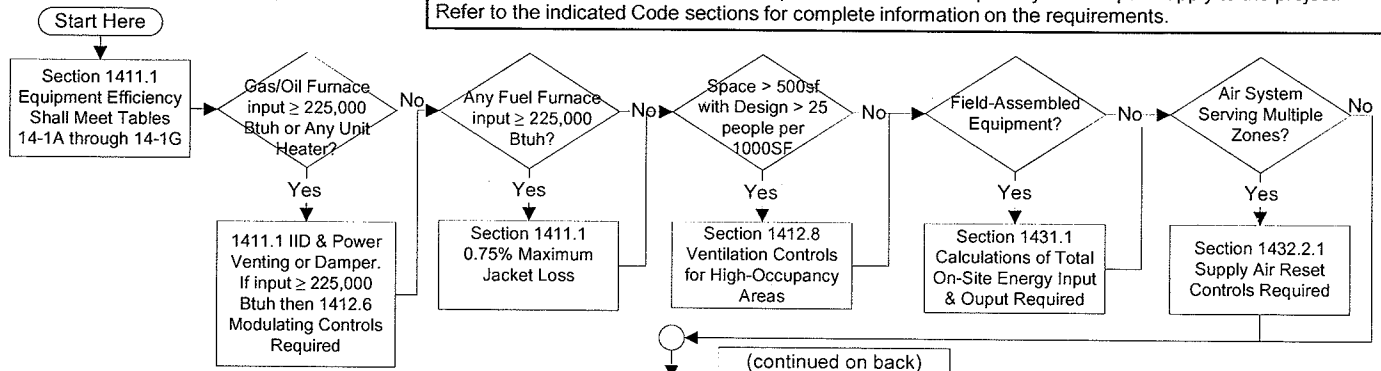
Location
on PlansBuilding Department
Notes**ADDITIONAL CHECKLIST ITEMS FOR COMPLEX SYSTEMS ONLY**

	1431.1	Field assem. sys.	Provide calculations for total onsite energy input/output to equip.		
	1431.2	System Sizing	Indicate equipment & system sizing complies with 1431.2		
	1432.1	Setback & shut-off	Indicate separate systems or show isolation devices on plans		
	1432.2.1	Air system reset	Indicate automatic temperature reset & operation sequence		
	1432.2.2	Hydr. Sys. reset	Indicate automatic temperature reset & operation sequence		
	1432.3.1	Hydr. Var. Flow	Indicate variable flow method for all applicable systems		
	1432.3.X	Hydronic Isolation	Indicate method of isolation for all applicable systems		
	1432.4	DDC Capabilities	Indicate control capabilities including demand response setpoint adj.		
	1432.4	DDC data mgmt	Indicate metering and trending capabilities.		
	1432.5	Pressure Reset	Indicate static pressure reset for VAV systems		
	1433	Air Economizer	Indicate economizer on equipment schedule or provide calculations to justify exemption. Demonstrate higher efficiency equipment if required.		
	1433	Water Economizer	Indicate water economizer and provide calculations showing compliance with 1413 if 1433 Exception 3 is utilized		
	1434	Separate air sys.	Indicate special requirement zones and indicate systems		
	1435	Simul. htg. & clg.	Indicate method of prohibiting simultaneous heating and cooling, or state exception and show supporting calculations		
	1436	Heat recovery	Indicate heat recovery of all applicable systems on plans; complete and attach heat recovery calculations		
	1437	Elec. motor effic.	MECH-MOT or Equip. Schedule with hp, rpm, efficiency		
	1438	Variable speed drives	Indicate VS control or equivalent on schedules for all applicable equip.		
	1438.1	Heat Rejection	Indicate heat rejection equipment types and fan types		
	1438.2	Hot Gas Bypass	Indicate cooling equipment staging and capacity modulation abilities		
	1438.3	Large Volume sys	Indicate multiple system rooms & indicate ventilation control		
	1439.1	Kitchen Hoods	Indicate source and conditioning of make-up air		
	1439.2	Laboratory Exhaust	Indicate HR, VAV, semi-conditioned makeup, or CERM calc		

If "no" is circled for any question, provide explanation:

Decision Flowchart

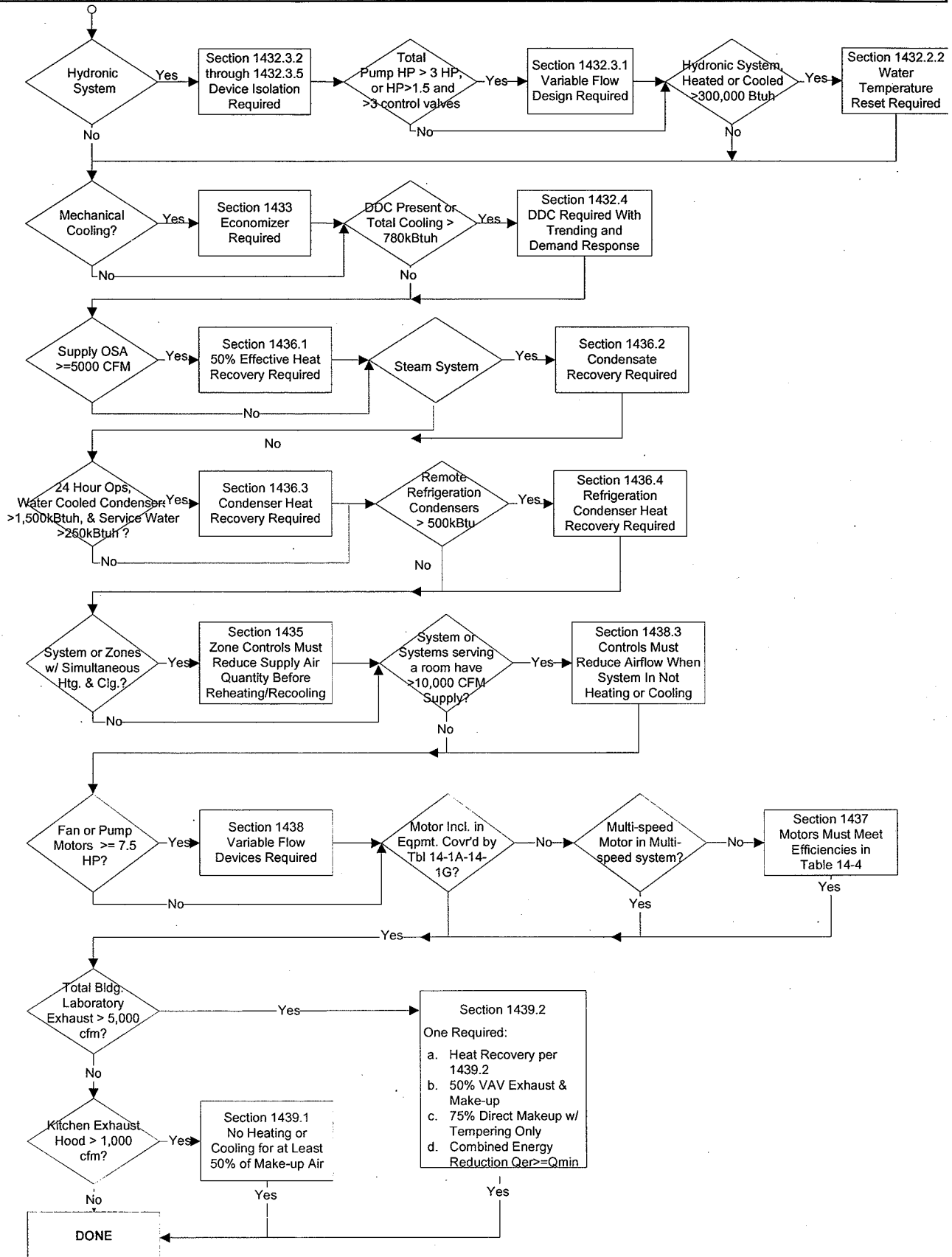
Use flowchart to determine how the requirements of the Complex Systems Option apply to the project. Refer to the indicated Code sections for complete information on the requirements.



Mechanical - Complex Systems (back)**MECH-COMP**

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Economizer**MECH-ECO**

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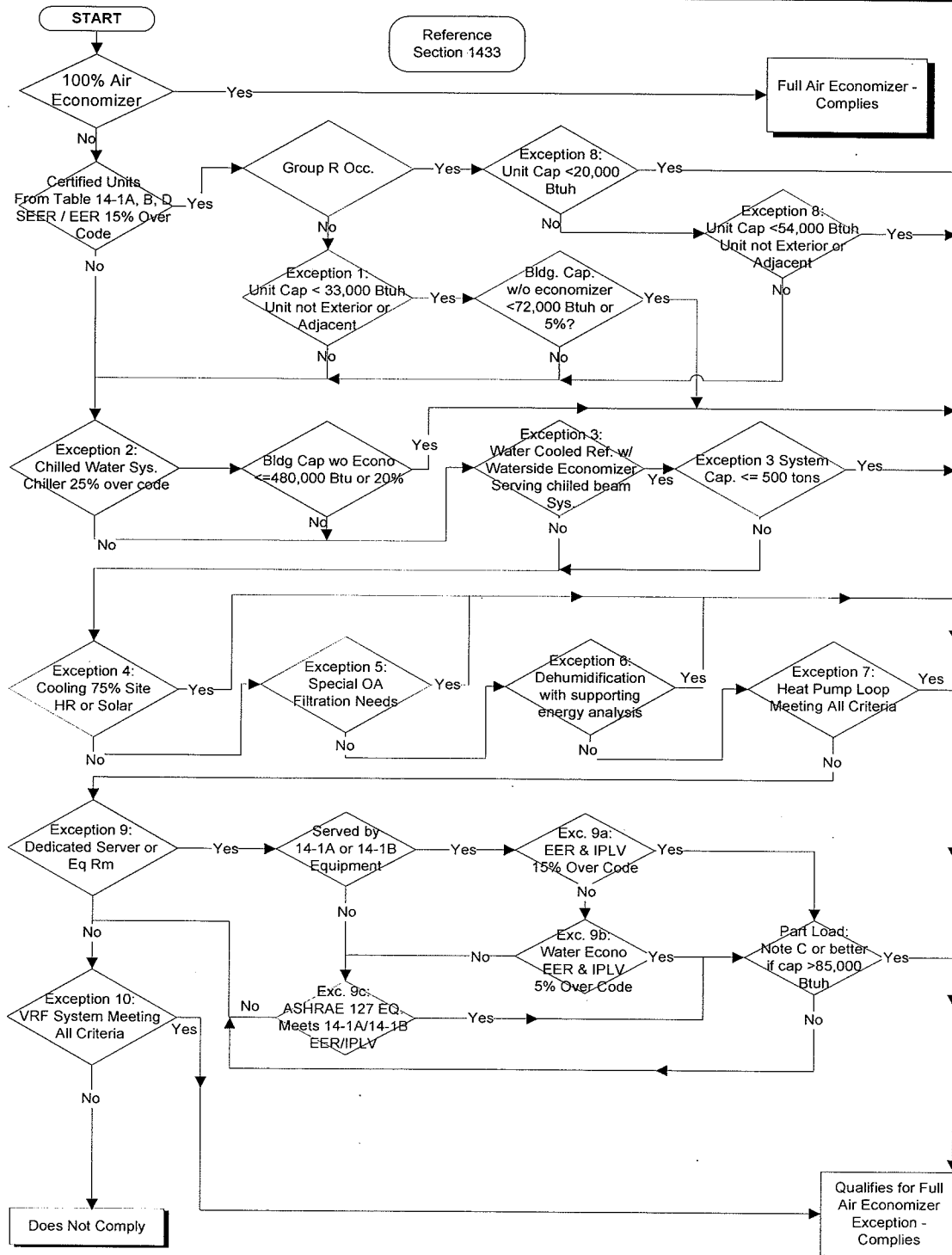
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Economizer Summary

Check box(es) for exceptions being claimed. List the system/equipment that qualifies for each exception. See Section 1433 for full description of Economizer requirements.

☐ Full Air Econo:☐ Ex 1:☐ Ex 5:☐ Ex 9a:☐ Ex 2:☐ Ex 6:☐ Ex 9b:☐ Ex 3:☐ Ex 7:☐ Ex 9c:☐ Ex 4:☐ Ex 8:☐ Ex 10:**Decision Flowchart**

Use this flowchart to determine if project complies with Economizer requirements. If not, the Systems Analysis Option must be used.



Minimum Nominal Full-Load Efficiencies (%) As of 12/19/2010						
	Open Motors			Enclosed Motors		
Synchronous Speed (RPM)	3,600	1,800	1,200	3,600	1,800	1,200
Motor HP						
1.0	77.0	85.5	82.5	77.0	85.5	82.5
1.5	84.0	86.5	86.5	84.0	86.5	87.5
2.0	85.5	86.5	87.5	85.5	86.5	88.5
3.0	85.5	89.5	88.5	86.5	89.5	89.5
5.0	86.5	89.5	89.5	88.5	89.5	89.5
7.5	88.5	91.0	90.2	89.5	91.7	91.0
10.0	89.5	91.7	91.7	90.2	91.7	91.0
15.0	90.2	93.0	91.7	91.0	92.4	91.7
20.0	91.0	93.0	92.4	91.0	93.0	91.7
25.0	91.7	93.6	93.0	91.7	93.6	93.0
30.0	91.7	94.1	93.6	91.7	93.6	93.0
40.0	92.4	94.1	94.1	92.4	94.1	94.1
50.0	93.0	94.5	94.1	93.0	94.5	94.1
60.0	93.6	95.0	94.5	93.6	95.0	94.5
75.0	93.6	95.0	94.5	93.6	95.4	95.4
100.0	93.6	95.4	95.0	94.1	95.4	95.0
125.0	94.1	95.4	95.0	95.0	95.4	95.0
150.0	94.1	95.8	95.4	95.0	95.8	95.8
200.0	95.0	95.8	95.4	95.4	96.2	95.8
250.0	95.0	95.8	95.4	95.8	96.2	95.8
300.0	95.4	95.8	95.4	95.8	96.2	95.8
350.0	95.4	95.8	95.4	95.8	96.2	95.8
400.0	95.8	95.8	95.8	95.8	96.2	95.8
450.0	95.8	96.2	96.2	95.8	96.2	95.8
500.0	95.8	96.2	96.2	95.8	96.2	95.8

For motors claiming an exception, list motor and note which exception applies.

Mechanical Permit Plans Checklist**MECH-CHK**

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The following information is necessary to check a mechanical permit application for compliance with the mechanical requirements in the Washington State Nonresidential Energy Code.

Applicability (yes, no, na)	Code Section	Component	Information Required	Location on Plans	Building Department Notes
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HVAC REQUIREMENTS (Sections 1401-1424)

	1411	Equipment Performance			
	1411.1	Minimum efficiency	Equipment schedule with type, capacity, efficiency		
	1411.1	Combustion htg.	Indicate intermittent ignition, flue/draft damper & jacket loss		
	1411.1	Air-cooled chiller	Provide total air and water chiller capacity		
	1411.2.1	Water-cooled chiller	Full-load and NPLV values adjusted for any non-standard conditions		
	1411.4	Pkg. elec. htg. & clg.	List heat pumps on schedule		
	1411.5	Unenclosed Heat	Indicate radiant heat system and occupancy controls		
	1412	HVAC Controls			
	1412.1	Temperature zones	Indicate locations on plans		
	1412.2	Deadband control	Indicate 5 degree deadband minimum		
	1412.3	Humidity control	Indicate humidistat		
	1412.4	Setback and Shutoff	Indicate thermostat with 7 day program capability & required setback		
	1412.4.1	Dampers	Indicate damper location, leakage rate, control type, & max. leakage		
	1412.4.2	Optimum Start	Indicate optimum start controls		
	1412.5	Heat pump control	Indicate heat pump thermostat & outdoor lockout on schedule		
	1412.6	Combustion heating	Indicate modulating or staged control		
	1412.7	Balancing	Indicate balancing features on plans		
	1412.8	Ventilation Control	Indicate demand control ventilation for high-occupancy areas		
	1412.9	Loading Dock & Garage Ventilation	Indicate enclosed loading dock & parking garage ventilation system activation and control method.		
	1422	Thermostat interlock	Indicate thermostat interlock on plans		
	1432.2.1	Temperature Reset	Indicate temperature reset method		
	1413	Air / Water Economizers			
	1412.1	Single zone systems	Indicate multiple cooling stage control capability.		
	1413.1	Air Econo Operation	Indicate 100% capability on schedule		
	1413.1	Wtr Econo Operation	Indicate 100% capacity at 45 degF db & 40 deg F wb		
	1413.2	Wtr Econo Document	Indicate max. OSA condition for design clg load & equipment performance data.		
	1413.3	Integrated operation	Indicate capability for partial cooling		
	1413.4	Humidification	Indicate direct evap or fog atomization w/ air economizer		
	1414	Ducting Systems			
	1414.1	Duct sealing	Indicate duct design pressures, sealing, and testing requirements		
	1414.1.2	Low press. duct test	Indicate applicable low pressure duct systems shall be leak tested		
	1414.1.3	High press. duct test	Indicate high pressure duct systems shall be leak tested, and identify the location of this ductwork on plans		
	1414.2	Duct insulation	Indicate R-value of insulation on duct		
	1415	Piping Systems			
	1415.1	Piping insulation	Indicate R-value of insulation on piping		
	1416	Completion Requirements			
	1416.3.2	System Balancing	Indicate air and water system balancing requirements		
	1416.3.3	Functional Testing	Provide sequence of operations and test procedures.		
	1416.3.4	Documentation	Indicate O&M manuals, record drawings, staff training		
	1416.3.5	Comm. Report	Indicate requirements for final commissioning report		
	1416.4	Compliance Chklist	Submit to building official upon substantial completion.		
	Mechanical Summary Form		Completed and attached. Equipment schedule with types, input/output, efficiency, cfm, hp, economizer		

Mechanical Permit Plans Checklist Continued**MECH-CHK**

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1/4/2011

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Applicability (yes, no, na)	Code Section	Component	Information Required	Location on Plans	Building Department Notes
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SERVICE WATER HEATING AND HEATED POOLS (Sections 1440-1454)

	1440	Service water htg.			
	1441	Elec. water heater	Indicate R-10 insulation under tank		
	1442	Shut-off controls	Indicate automatic shut-off of circulators or heat trace		
	1443	Pipe Insulation	Indicate R-value of insulation on piping		
	1444	Pump Energy	Indicate method of pump energy management (Sec 1438)		
	1445	Heat Recovery	Indicate preheat capacity as % of peak service water demand.		
	1460	Heated Pools			
	1452	Heat Pump COP	Indicate minimum COP of 4.0		
	1452	Heater Efficiency	Indicate pool heater efficiency		
	1453	Pool heater controls	Indicate switch and 65 degree control		
	1454	Pool covers	Indicate vapor retardant cover		
	1454	Pools 90+ degrees	Indicate R-12 pool cover		
	1455	Heat Recovery	Indicate method and capacity of exhaust air temperature reduction		

COLD STORAGE (Sections 1460-1465)

	1460	Cold Storage			
	1463	Evaporators	Indicate motor type and speed control		
	1464	Condensers	Indicate condenser cooling type, design wb temp and control		
	1465	Compressors	Indicate design minimum condensing temp and control.		

If "no" is indicated for any item in Sections 1401-1424 or 1440-1465 , provide explanation: